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1999.12.08

Freddy Strømme

Freddy Strømme  
Seksjonsleder

Ellen B. Olsen

Ellen B. Olsen



PATENTSTYRET

Styret for det industrielle rettsvern

1. desember 1998

5 JGS/mlm  
o: 129913

SØKER:

10 Telefonaktiebolaget LM ERICSSON  
S-126 25 Stockholm  
Sverige

15

OPPFINNER:

Bjørn Magne Dybedokken  
Nedre Tøppenhaug 86

20 1353 Bærums Verk

25 TITTEL:

Anordning ved et nett, spesielt for store digitale  
forbedrede trådløse telekommunikasjonssystemer (DECT)

30

FULLMEKTIG:

Oslo Patentkontor AS, Postboks 7007M, 0306 Oslo

ARRANGEMENT IN A NETWORK, ESPECIALLY FOR LARGE DIGITAL  
ENHANCED CORDLESS TELECOMMUNICATIONS (DECT) SYSTEMS.

Field of the invention

5

The present invention relates to an arrangement in a network, especially for large Digital Enhanced Cordless Telecommunications (DECT) Systems, i.e. systems with several fixed parts connected to the same local network.

10

Technical background

**The problem area**

In fig. 1 there is illustrated a DECT system with several Fixed Parts (FP) connected to the same local network (LNW). An FP contains all the elements in a DECT network between the local network (LNW) and the DECT air interface.

20 Each FP has an ID that is unique within the network, the Primary Access Rights Identity, PARI.

Each Radio Fixed Part (RFP, base station) has a Radio Fixed Part Number, RPN that is unique within the fixed part that it is connected to. The base stations transmit a Radio Fixed Part Identity, RFPI, on the air interface. The RFPI is a combination of the PARI, the RPN and an extension bit E, and identifies the RFP and the FP that the RFP is connected to. The RFPI is used by the Portable Parts, PPs (handsets), to determine if they have access to the network.

In addition to the RFPI, the RFP may transmit a *Secondary Access Rights Identity*, SARI, which may also be used to give the PPs access to the network.

5 The layout and rules for use of ARIs and RFPI is defined in (1).

The structure of ARI and RFPI for private networks, class B, is shown in Figure 2. The elements are defined as follows:

10

**E Extension bit.** Indicates if an SARI is available or not. Not relevant for this document.

**ARC Access Rights Class**

Shows the type of access to a DECT network, such as residential, private or public.

15

**EIC Equipment Installer's code**

This a code that is supplied by ETSI identifies the installer of the DECT system, e.g. Ericsson.

**FPN Fixed Part Number**

20 A 12-bit number that identifies the fixed part. The number is unique to each FP within a network.

**RPN Radio Fixed Part Number**

An 8-bit number that identifies the radio fixed part. The number is unique to each RFP within an FP.

25

The problem that this Invention Disclosure discusses is that of handling the different parameters such as PARI, RPN and HLI, in a network with many FPs. This applies both to the network owner, who must keep track of a number of parameters in his own network, and to the Equipment Installer (e.g. Ericsson) who must keep a data base of parameters for all the fixed parts sold.

30

If an FP or RFP is to be removed, or if an FP or RFP is added to the network, the FP or RFP must be assigned a PARI or an RPN. There are also other parameters that must be adapted to handle the new or removed FP or RFP, such as HLI. The Equipment Installer must find a free identity (ARI) for the customer (network owner), and the customer must then assign the value to the network.

This manual administration of parameters requires extensive bookkeeping and is therefore time consuming and costly.

#### Known solution

The use of DECT identities is described in detail in ETSI standards (1). ETSI does not, however, say anything about how the dealer of the system shall select and maintain the parameters.

#### Problems with known solutions

Administration of identities for DECT systems is time consuming and costly both for the manufacturer and the operator of the equipment. Anything that can reduce the complexity of operation is therefore desirable.

The problems with handling DECT identities can be separated in three areas:

- 1 **Manufacturer:** Assigning ARI values of the DECT equipment that is sold, and maintaining a database of these with reference to whom the equipment is sold. This is especially complex if the equipment is sold via retailers.

2     **Network owner:** More work to install new fixed parts,  
because the PARIs must be known and entered into the  
system manually. One cannot simply connect the  
5     hardware and start using it.

3     **Security (Network owner):** It is desirable to have as  
many of the (most significant) bits in the ARI for  
the different FPs in a network equal, to reduce the  
10    risk of illegal access. This decides the length of  
the HLI, and to maintain as high a security level as  
possible, the value of the HLI should be small. If  
FPs, with a different EIC than the existing FPs in  
the network, are added, the HLI will be large, and  
15    illegal access to the system will be easier.

#### Further prior art

From US 5,077,790 (D'Amico et al.) there is known a  
20    method for registration of a portable unit, that may be  
used in a communication system, comprising a network  
controller having a database for storing portable  
identification numbers. However, this prior art is silent  
about how to extend a telecommunication system having  
25    several fixed parts, in a safe and expedient manner.

US 5,572,574 relates to a method of on-air registration  
of a cordless telephone handset with a base station.  
Consequently, also this publication is silent about how  
30    to install new fixed parts in a network.



### Objects of the invention

5 An object of the present invention is to provide an arrangement whereby the problems related to known solutions are eliminated.

10 Another object of the present invention is to provide an arrangement whereby the dealer of the system can select and maintain the related parameters in a far more expedient manner.

15 Still another object of the present invention is to provide an arrangement whereby a network owner can install new fixed parts in a more time-saving and appropriate manner.

20 Yet another object of the present invention is to provide an arrangement whereby the network owner can maintain a high and secure level in order to reduce the risk of illegal access.

### Summary of the invention

25 These objects are achieved in an arrangement as stated in the preamble, which according to the present invention is characterised by the features as stated in the characterising clause of the enclosed patent claim 1.

30 In other words, according to the present invention there is given a solution of automatically generating the needed identities.

Further features and advantages of the present invention will appear from the following description taken in conjunction with the enclosed drawings, as well as from the further enclosed patent claims.

5

Brief disclosure of the drawings

Fig. 1 is a schematical diagram illustrating a DECT system with several fixed parts, in which system the present invention can find its application.

10

Fig. 2 is a schematical diagram illustrating the layout of ARI and RFPI class B, private access.

15 Detailed description of embodiments

Reference is made to Fig. 1, wherein is illustrated a Digital Enhanced Cordless Telecommunications System, DECT. This system comprises several fixed parts FP connected to the same local network LNW. An FP contains all the elements in a DECT network between the local network LNW and the DECT air interface.

20

Each FP has an ID that is unique within the network, the Primary Access Rights Identity, PARI.

25

Consequently, each FP connected to a LNW must have its own, unique PARI within the network.

30 The local network will manage the PARI identities such that each FP has its own unique PARI. The FP will manage the identities of the base stations, such that each base station has an RPN that is unique within the fixed part.

The local network will automatically select a new ARI when a new FP is connected. The FP will select a new base station identity when a new base station is connected.

- 5 When the first FP is connected to the network, the network must be given an SARI. The value of the SARI is given to the network operator by an Equipment installer (ref. EIC), and is entered into the network manually. The value of the SARI is unique to the network, and is  
10 distributed to all the FPs in the network, and is transmitted on all RFPs.

- The PARI for each FP is calculated using the EIC-part of the SARI, see Figure 2. The HLI, which is common to the  
15 LNW, is recalculated and distributed to all FPs in the LNW when a new FP is added or removed.

- The RPN for each RFP is handled by the individual FPs, and is automatically given to the RFPs when they are  
20 connected.

#### Advantages

- The automatic generation of parameters will reduce  
25 service and maintenance cost both for the manufacturer/distributor and the operator of cordless telecommunication systems. This creates a concept of "plug-and-play".
- 30 Assigning similar PARI values to all FPs in a system ensures that the value of the HLI will be small. This reduces the risk that other users will attempt (illegal) access to the network.

Broadening

May be applicable to other cordless and cellular systems.

5

Glossary and Acronyms**Glossary****Fixed Part**

10

A physical grouping that contains all the elements in the DECT network between the local network and the DECT air interface.

15 **Equipment Installer**

The organisation that is responsible for installing the DECT equipment, usually the same as the manufacturer, e.g. Ericsson.

20 **Local Network**

A telecommunication network capable of offering local telecommunication services. In this document, the term "network" is used in the same meaning as "Local Network".

25

**Portable Part**

A physical grouping that contains all the elements between the user and the DECT air interface. Usually the cordless telephone handset.

30

**Radio fixed part**

A physical sub-group of an FP that contains all the radio endpoints that are connected to

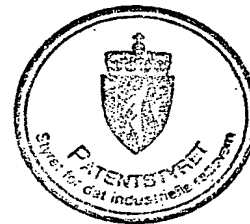
a single system of antennas  
(=radio base station)

#### Acronyms

	<b>ARI</b>	Access Rights Identity
5	<b>DECT</b>	Digital Enhanced Cordless Telecommunications
	<b>EIC</b>	Equipment Installer's Code
	<b>FP</b>	Fixed Part
	<b>HLI</b>	Handover Length Indicator
	<b>LNW</b>	Local Network
10	<b>PARI</b>	Primary Access Rights Identity
	<b>PARK</b>	Portable Access Rights Key
	<b>PP</b>	Portable Part
	<b>RFP</b>	Radio Fixed Part
	<b>RPN</b>	Radio fixed Part Number
15	<b>SARI</b>	Secondary Access Rights Identity

#### Reference documents

- (1) **ETS300175-6 Second Edition**
- 20      Radio Equipment and systems (RES);  
          Digital Enhanced Cordless Telecommunications (DECT);  
          Common Interface (CI);  
          Part 6: Identities and addressing



## C l a i m s

1. Arrangement in a network, especially for large Digital  
Enhanced Cordless Telecommunications (DECT) systems, i.e.  
5 systems with several fixed parts (FP) connected to the  
same local network (LNW),

c a r a c h e r i s e d i n that each fixed part (FP)  
is given its own unique Primary Access Rights Identity  
(PARI), said PARI identities being managed by the local  
10 network LNW, and that each fixed part (FP) will manage  
the identities of associated Radio Fixed Parts/base  
stations (RFP) such that each base station will be given  
a Radio Fixed Part Number (RPN) that is unique with the  
Fixed Part (FP).

15

2. Arrangement as claimed in claim 1,  
c a r a c h e r i s e d i n that said local network  
(LNW) is further provided with means for selecting new  
Access Rights Identity (ARI) when a new fixed part (FP)  
20 is connected.

3. Arrangement as claimed in claim 1 or 2,  
c a r a c h e r i s e d i n that said fixed part (FP)  
comprises means for selecting a new base station/Radio  
25 Fixed Part Identity when a new base station/Radio Fixed  
Part is connected.

4. Arrangement as claimed in any of the preceding claims,  
c a r a c h e r i s e d i n that said network is  
30 given a Secondary Access Rights Identity (SARI),  
especially when a first fixed part (FP) is connected to  
the network.

5. Arrangement as claimed in claim 4,  
c a r a c h e r i s e d i n that said SARI is given  
to the network operator by an Equipment installer and is  
entered into the network manually.

5

6. Method as claimed in claim 4 or 5,  
c a r a c h e r i s e d i n that said SARI, being  
unique to the network, is distributed to all the FPs in  
the network and is transmitted to all RFPs.

10

7. Arrangement as claimed in any of the preceding claims,  
c a r a c h e r i s e d i n that said PARI of each FP  
is calculated by using the EIC-part of the SARI.

15

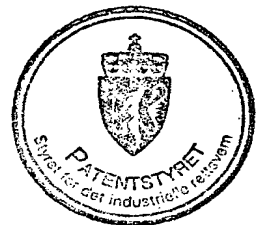
8. Arrangement as claimed in any of the preceding claims,  
c a r a c h e r i s e d i n that the Handover Length  
Indicator (HLI), which is common to the LNW, is  
recalculated and distributed to all FPs in the LNW when a  
new FP is added or removed.

20

9. Arrangement as claimed in any of the preceding claims,  
c a r a c h e r i s e d i n that the RPN for each RFP  
is handled by the individual FPs, and is automatically  
given to RFPs when they are connected.

25

10. Arrangement as claimed in any of the preceding  
claims,  
c a r a c h e r i s e d i n that the arrangement is  
implemented as a "plug-and-play" concept.

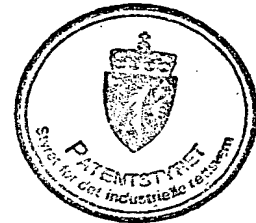


## A b s t r a c t

The present invention relates to an arrangement in a network, especially for large Digital Enhanced Cordless  
5 Telecommunications (DECT) Systems, i.e. systems with several fixed parts (FP) connected to the same local network (LNW), and for the purpose of providing a system that can select and maintain the parameters of such a system in a more efficient and expedient manner, it is  
10 according to the invention suggested that each fixed part (FP) is given its own unique Primary Access Rights Identity (PARI), said PARI identities being managed by the local network LNW, and that each fixed part (FP) will manage the identities of associated Radio Fixed  
15 Parts/base stations (RFP) such that each base station will be given a Radio Fixed Part Number (RPN) that is unique with the Fixed Part (FP).

Fig. 1

20





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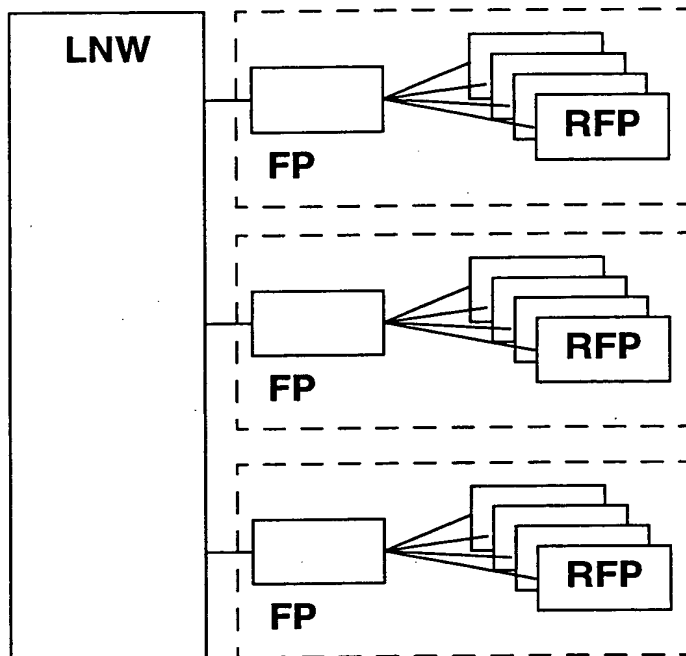


Figure 1

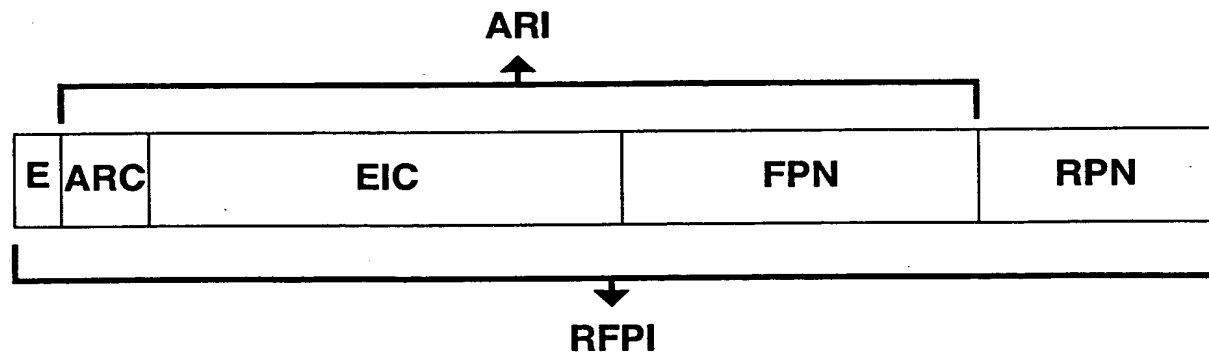
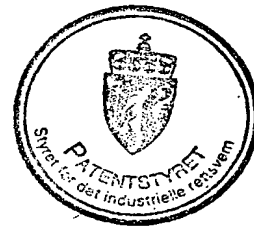


Figure 2



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